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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/613,506

07/03/2003

Stephen G. Evangelides JR.

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08/09/2006

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EXAMINER

GARCIA, LUIS

ART UNIT

PAPER NUMBER

2613

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/613,506 | EVANGELIDES ET AL. | |
| | Examiner | Art Unit | |
| | Luis F. Garcia | 2613 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on July 3, 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on July 3, 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because in FIGs. 1 and 4-6 the words, lettering and/or numbering are not clear; furthermore, there are two sets of page numbers for FIGs. 5 and 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claim 1 is rejected** under 35 U.S.C. 102(e) as being anticipated by Tsuda et al (US 7,068,876) hereinafter referred to as Tsuda.

Regarding claim 1, Tsuda discloses an optical transmission system (**FIG. 1**), comprising:

a transmitter unit (**FIG. 1 (2-optical transmitter)**);

a receiver unit (**FIG. 1 (4-optical receiver)**);

an optical transmission path interconnecting the transmitter and receiver units (**FIG. 1 (6-transmission line)**) in which the transmission line (path) interconnects the optical transmitter and the optical receiver);

a plurality of optical repeaters situated along the transmission path (**FIG. 1 (10_{#1-3}-optical amplifiers)**) in which the optical amplifiers (repeaters) are situated along transmission line-6), wherein adjacent ones of the repeaters are interconnected by transmission spans that collectively constituting a majority of the optical transmission path (**FIG. 1 (8_{#1-4}-fiber segments, 10_{#1-3}-optical amplifier)**) in which adjacent optical amplifiers (repeaters) are interconnected by transmission segments

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(transmission spans) that constitute a majority of the optical transmission line (path)), each of said transmission spans comprising substantially identical lengths of cabled optical fiber having substantially identical prescribed path average dispersions (FIG. 1 (8_{#1-4}-fibe segments) and col8 ln34-37 in which each transmission segment (span) is substantially identical in length; thereby, producing substantially identical prescribed path average dispersions (e.g. FIG. 4 all spans are made up of the same length SMF or DSF spans, which creates substantially identical path average dispersions));

at least one adjustable dispersion trimming element located in at least one of said optical repeaters **(FIG. 1 (10_{#1-3}-optical amplifiers) and FIG. 2B (10-optical amplifier, DC-dispersion compensator) in which all the dispersion compensator(s) are located in the optical amplifiers. NOTE: Tsuda's dispersion compensators are variable as described in col7 ln22-45 in which the dispersion compensators are set from a plurality of stepwise dispersions based on span length, e.g. adjustable between a plurality of stepwise dispersion values) and optically coupling one of said transmission spans to an optical amplifier located in said at least one repeater (FIG. 1 in which the transmission segments are coupled to at least one optical amplifier), said adjustable dispersion trimming element having an adjustable path average dispersion selected such that a total path average dispersion of the transmission span to which it is coupled plus the adjustable dispersion trimming element has a desired value (FIG. 2B, 5 and col7 ln22-45 in which the adjustable dispersion compensator(s) are set in order achieve an average dispersion value**

of the transmission span which is within a tolerance of dispersion (desired value)).

Regarding claim 14, Tsuda discloses an optical transmission system, comprising:

- a transmitter unit (FIG. 1 (2-optical transmitter));**
- a receiver unit (FIG. 1 (4-optical receiver));**
- an optical transmission path interconnecting the transmitter and receiver units (FIG. 1 (6-transmission line) in which the transmission line (path) interconnects the optical transmitter and the optical receiver), said optical transmission path having a periodic dispersion map with a period comprising a fixed component and an adjustable component (FIG. 1 in which the transmission path has a period (length) in which the dispersion map comprises fixed (fixed transmission segments) and adjustable (adjustable dispersion compensators) components. NOTE: Tsuda's dispersion compensators are variable as described in col7 ln22-45 in which the dispersion compensators are set from a plurality of stepwise dispersions based on span length; e.g. adjustable between a plurality of stepwise dispersion values);**
- a plurality of optical repeaters situated along the transmission path, wherein adjacent ones of the repeaters are spaced apart by respective transmission spans (FIG. 1 in which the optical amplifiers (repeaters) are situated along the transmission line (path) such that adjacent optical amplifiers are spaced apart by transmission segments (e.g 8_{#1-4})), said fixed components of the periodic dispersion map being**

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provided by the respective transmission spans (**FIG. 1 (8_{#3}-segment) in which the transmission segment(s) provide the fixed portion of the periodic dispersion map (e.g. each fiber has a fixed dispersion slope as seen in FIG. 4/col5 ln62-67 to col6 ln1-7))**;

at least one adjustable dispersion trimming element located in at least one of said optical repeaters and optically coupling one of said transmission spans to an optical amplifier located in said at least one repeater (**FIG. 1 (10_{#1-3}-optical amplifiers) and FIG. 2B (10-optical amplifier, DC-dispersion compensator) in which all the dispersion compensator(s) are located in the optical amplifiers**), said adjustable dispersion trimming element having an adjustable path average dispersion that provides said adjustable component of the periodic dispersion map (**FIG. 1 (10_{#1-3}-optical amplifiers)/FIG. 2B (DC-dispersion compensator) and col7 ln22-45 in which the adjustable dispersion compensator provides the adjustable component of the periodic dispersion map**), said adjustable path average dispersion being selected such that the fixed component of the period of the periodic dispersion map plus the adjustable component of the dispersion map associated therewith has a desired value (**FIG. 2B, 5 in which the adjustable dispersion compensator(s) are set in order achieve an average dispersion value of the transmission span which is within a tolerance of dispersion (desired value)**).

Regarding claim 27, rejected as stated in claim 14 apparatus rejection.

Regarding claim 40, rejected as stated in claim 14 apparatus rejection in which assembling Tsuda's optical transmission system is an inherent property in order to have a working system.

Regarding claims 2, 15 and 29, Tsuda further discloses wherein said at least one adjustable dispersion trimming element includes a plurality of adjustable dispersion trimming elements respectively located in the plurality of optical repeaters and being optically coupled to a respective one of the transmission spans (**FIG. 1, 2B in which the adjustable dispersion compensators are located in a plurality of optical amplifiers which are optically coupled to the transmission segments (spans)**)).

Regarding claims 3, 16, 28, 30 and 41, Tsuda further discloses wherein each of said optical repeaters includes an optical amplifier, said at least one adjustable dispersion trimming element being located at an input to one of said optical amplifiers (**FIG. 2B: optical amplifier (10)(repeater) in which the adjustable dispersion compensator is located at the input of the optical amplifier (e.g. at the input of rear amplifier-24)**)).

Regarding claims 4, 17, 31 and 42, Tsuda further discloses wherein each of said optical repeaters includes an optical amplifier, said at least one adjustable dispersion trimming element being located at an output to one of said optical amplifiers (**FIG. 2B: optical amplifier (10)(repeater) in which the adjustable dispersion compensator is located at the output of the optical amplifier (e.g. at the output of front amplifier-22)**)).

Regarding claims 5, 32 and 43, Tsuda further discloses wherein said prescribed path average dispersion of each of the transmission spans is approximately equal to zero (**FIG. 4 (SMF, DSF) in which the transmission segments of FIG. 1 (8_{#1-3}) are composed of SMF or DSF fiber which have approximately zero dispersion at operating wavelengths 1.3nm and 1.55 nm respectively; thereby, making the path average dispersion of each segment (span) approximately zero**).

Regarding claims 6, 20, 33 and 40, Tsuda further discloses wherein said optical amplifiers are rare-earth doped optical amplifiers (**FIG. 1 (10_{#1-3}) and col1 ln19-25 in which an EDFA (rare-earth doped optical amplifier) is used to compensate for fiber loss**).

Regarding claim 7, rejected as stated in claim 6 rejection.

Regarding claims 10, 12, 23,25, 36, 38, 47 and 49, Tsuda further discloses wherein at least one of said transmission spans comprises a cabled optical fiber having a single value of dispersion (**FIG. 4 and col8 ln34-37 in which the a transmission segment (span) is composed of a SMF (single mode fiber) with a single value of dispersion at a given wavelength**).

Regarding claims 11, 24, 37 and 48, Tsuda further discloses wherein at least one of said transmission spans comprises a plurality of cabled optical fibers each having a different value of dispersion (**col3 ln41-46 in which the transmission span comprises both SMF and DSF fiber, each having a different value of dispersion- FIG. 4**).

Regarding claim 18, Tsuda discloses the optical transmission system of claim 14 as applied above.

Tsuda further discloses wherein said fixed component of the periodic dispersion map is approximately equal to zero (**FIG. 4 (SMF, DCF) in which the transmission segments of FIG. 1 (8_{#1-3}) are composed of SMF or DCF fiber which have approximately zero dispersion at operating wavelengths 1.3nm and 1.55 nm respectively; thereby, making the path average dispersion of each segment (span) approximately zero**).

Regarding claim 19, Tsuda discloses the optical transmission system of claim 14 as applied above.

Tsuda further discloses wherein said optical repeaters include at least one optical amplifier (**FIG. 1 (10_{#1-3}-optical amplifiers) in which the system includes optical amplifiers (optical repeaters)**).

Regarding claims 28, 30 and 41, rejected as stated in claim 3 apparatus rejection in which the adjusting step is performed by the adjustable dispersion compensator.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 8, 9, 13, 21, 22, 26, 34, 35, 39, 45, 46 and 50 are rejected** under 35 U.S.C. 103(a) as being unpatentable over Tsuda.

Regarding claims 8, 9, 21, 22, 34, 35, 45 and 46, rejected as stated in claim 1 rejection in which it is a matter design choice as to which well know adjustable dispersion compensator (e.g. tunable Bragg grating, trimmed spool of fiber) Tsuda's incorporates as the dispersion compensator in FIG. 2B. For a tunable Bragg grating, phase tunable couplers and a spool of DCF/SMF/DSF/Non-DSF are all equally applicable.

Regarding claims 13, 26, 39 and 50, Tsuda further discloses wherein said spooled optical fiber has a dispersion value substantially greater than said single dispersion value of the cabled optical fiber (**Tsuda's dispersion compensator has a dispersion value substantially greater then the single dispersion value of the cabled optical fiber as seen in FIG. 4 (SMF, DSF) in which their respective single dispersion values are substantially zero at 1.3,1.55nm and FIG. 5 (at 10_{#1-3}) in which the dispersion compensators have a substantially greater single dispersion value then the SMF, DCF segments. For example TABLEs 1,2 in which each dispersion compensator located within each optical amplifier has a**

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substantially greater absolute single dispersion value, e.g. -600,-800,-1000 ps/nm).

Regarding claim 12, rejected as stated in claim 10 rejection.

Regarding claim 25, Tsuda discloses the optical transmission system of claim 21 as applied above.

Tsuda further discloses wherein at least one of said transmission spans comprises a cabled optical fiber having a single value of dispersion (**FIG. 4 and col8 ln34-37 in which the a transmission segment (span) is composed of a SMF (single mode fiber) with a single value of dispersion at a given wavelength**).

Regarding claims 38 and 49, rejected as stated in claim 10 apparatus rejection.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luis F. Garcia whose telephone number is (571)272-7975. The examiner can normally be reached on 8-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken N. Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LG


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